

CLAIMS

What is claimed is:

- 1 1. A method for depositing metal on a plating surface of an object immersed in an
2 electrolyte solution prior to bulk deposition on the horizontal surface of the plating
3 surface, the method comprises:
4 applying a voltage from an anode to the plating surface to enhance the
5 concentration of metal ions in the electrolyte solution that is contained in a feature on
6 the plating surface.
- 1 2. The method of claim 1, wherein during the method, the plating surface is immersed
2 within said electrolyte solution.
- 1 3. The method of claim 1, wherein the applying the voltage is sufficient to attract ions
2 to proximate the plating surface.
- 1 4. The method of claim 1, wherein the feature comprises at least one from the list of
2 trenches, contacts, and vias.
- 1 5. The method of claim 1, further comprising applying a current from the anode to the
2 plating surface to deposit metal from the metal ions in the feature, the current is applied
3 prior to the bulk deposition.
- 1 6. The method of claim 5, wherein the current is applied for a sufficient duration of fill
2 the feature.
- 1 7. The method of claim 6, wherein the features comprise a wall and a bottom, wherein
2 during the depositing the metal in the features, the deposition rate on the bottom is
3 greater than the deposition on the walls.
- 1 8. The method of claim 1, wherein following immersion the current (finite) is applied
2 for less than five seconds.

1 9. The method of claim 1, wherein the voltage is within the range of 2 to 10 volts.

1 10. The method of claim 9, wherein the voltage is 5 volts.

1 11. A computer readable medium that stores software that, when executed by a
2 processor, causes depositing metal on a plating surface of an object immersed in an
3 electrolyte solution prior to bulk deposition on the plating surface, the software
4 executed by the processor performs a method comprising:
5 applying a voltage between an anode and the plating surface to enhance the
6 concentration of metal ions in the electrolyte solution that is contained in a feature on
7 the plating surface.

1 12. The computer readable medium of claim 11, further comprising applying a current
2 from the anode to the plating surface to deposit metal from the metal ions in the feature,
3 the current is applied prior to the bulk deposition.

1 13. The computer readable medium of claim 12, wherein the current is not sufficient to
2 shut off the throat of the trenches or vias.

1 14. The computer readable medium of claim 12, wherein the current is performed for a
2 sufficient duration to fill the trenches or vias.

1 15. The computer readable medium of claim 12, wherein the features comprise a wall
2 and a bottom, wherein during the depositing metal from the metal ions in the features,
3 the deposition on the bottom is greater than the deposition on the walls.

1 16. The computer readable medium of claim 11, wherein the method is performed
2 within an electrolyte solution.

1 17. The computer readable medium of claim 11, wherein the applying the voltage to the
2 plating surface to increase the concentration of metal ions is sufficient to attract ions to
3 proximate the plating surface.

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1 18. The computer readable medium of claim 11, wherein the feature comprises at least
2 one from the list of trenches and vias.

1 19. The computer readable medium of claim 11, wherein the voltage is applied for less
2 than five seconds.

1 20. The computer readable medium of claim 11, wherein the voltage is within the range
2 of 2 to 10 volts.

1 21. The computer readable medium of claim 20, wherein the voltage is 5 volts.

1 22. An apparatus that deposits metal on a plating surface of an object immersed in an
2 electrolyte solution prior to bulk deposition on the plating surface, the apparatus
3 comprising:
4 a voltage biasing device coupled from an anode to the plating surface, the voltage
5 biasing device enhances the concentration of metal ions in electrolyte solution contained
6 in a feature on the plating surface.

1 23. The apparatus of claim 22, wherein the plating surface is immersed within said
2 electrolyte solution when the concentration of metal ions contained in the feature is
3 enhanced.

1 24. The apparatus of claim 22, wherein the feature comprises at least one from the list
2 of trenches, contacts, and vias.

1 25. The apparatus of claim 22, further comprising a current biasing device that applies a
2 current from an anode to the plating surface to deposit metal from the metal ions in the
3 feature, the current is applied prior to the bulk deposition.

1 26. The apparatus of claim 25, wherein the current applied by the current biasing device
2 is applied for a sufficient duration of substantially fill the feature.

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1 27. The apparatus of claim 26, wherein the features comprise a wall and a bottom,
2 wherein during the depositing metal from the metal ions in the features, the deposition
3 rate on the bottom is greater than the deposition on the walls.

1 28. The apparatus of claim 22, wherein the voltage biasing device applies the voltage for
2 less than five seconds.

1 29. The apparatus of claim 22, wherein the voltage biasing device applies the voltage
2 within the range of 2 to 10 volts.

1 30. The apparatus of claim 29, wherein the voltage biasing device applies the voltage of
2 5 volts.

1 31. An apparatus that deposits metal on a plating surface of an object immersed in an
2 electrolyte solution prior to bulk deposition on the plating surface, the apparatus
3 comprising:

4 voltage biasing means coupled from an anode to the plating surface, the voltage
5 biasing means enhances the concentration of metal ions in electrolyte solution contained
6 in a feature on the plating surface.

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